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## ***Cryptothrips laureli*, a New Thrips from Florida (Thysanop.).**

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(Plate IX.)

### INTRODUCTION.

While making a survey of the native bay trees of the genus *Tamala* (*Persca*) in the central part of Florida for the purpose of discovering, if possible, the origin of the camphor thrips (*Cryptothrips floridensis* Watson), a closely related species of *Cryptothrips* was found. The camphor thrips has proven a serious menace in the last few years to the newly developing camphor industry in the State and has been the subject of investigation by the Bureau. Although first taken to be an introduced insect peculiar to camphor, later developments tended to point to the fact that it might be native on the bays and had taken to the camphors because of their close botanical

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relationship. This theory,<sup>2</sup> that the native bays were the natural host for the camphor thrips, was held for some time. However, the results of this investigation have shown that the thrips on the bay, although identical in many respects with the camphor thrips, is a new species distinct from *C. floridensis*. The purpose of this paper, therefore, is to describe this new bay thrips and give its biological habits and other points of interest.<sup>3</sup>

#### DESCRIPTION OF BAY THRIPS.

*Cryptothrips laureli* n. sp. (Plate IX, A, B, C.)

Close to *C. floridensis* Watson, but differs in the following characters: general size, color and length of antennae; relative shape and size of third antennal segment; stronger spines on head, thorax and abdomen; number of doubled hairs on fringe of wings. Also in color and appearance of eggs, color of larvae, feeding habits, preferred host plants, general biological habits, such as length of instars, reproductive methods, etc.

*General color* almost uniformly glossy black; tarsi dark brown; antennae dark brown to black with exception of segment three, which is clear yellow.

*Average measurements*: Total length of insect, exclusive of antennae, 2.7 mm.; head, length .34 mm., width .25 mm.; prothorax, length .23 mm., width .44 mm.; mesothorax, width .54 mm.; abdomen, greatest width .57 mm.; tube, length .25 mm.; width at base .084 mm.

*Antennae*: 1, 37.1 microns; 2, 58.8 microns; 3, 107.1 microns; 4, 94.2 microns; 5, 85.4 microns; 6, 75.6 microns; 7, 67.2 microns; 8, 36.8 microns; total length .56 mm.

*Head* nearly one and one-half times as long as wide, cylindrical, sides almost straight and parallel; one rather prominent spine back of each eye. *Eyes* dark brown, rather large and prominent, finely faceted, not pilose. *Ocelli* present, concolorous with eyes, inconspicuous. *Mouth-cone* blunt, reaching nearly across the pronotum. *Antennae* with eight segments, almost twice as long as head; first two segments heavy, third segment long and slender in proportion to the others; segments one and two concolorous with the head, segment three clear yellow, segment four light brown at base and shading into darker brown toward the tip, remaining segments dark brown or black; bristles and sense-cones thick.

Prothorax short, slightly shorter than the width of the head, widest

<sup>2</sup>Watson, J. R. "The Native Host-Plant of the Camphor Thrips." In "Florida Buggist," Vol. III, No. 2, p. 25, 1919.

<sup>3</sup>The writer is indebted to Mr. W. W. Yothers, under whose direction this work was done, for many valuable suggestions in accomplishing it.

in center and narrowed toward each end; two prominent spines on both the anterior and posterior lateral margins. Mesothorax very short with straight parallel sides, about one and one-fourth times as wide as the prothorax. One short spine on each lateral margin. *Pterothorax* slightly narrower than the abdomen, sides almost straight. *Legs* long and slender except the fore femora; tarsi dark brown but otherwise concolorous with the body. *Wings* transparent, rather short, about two-thirds of length of abdomen, very slight constriction, finely fringed with hairs and doubled for from 5 to 13 hairs, usually about 7 hairs. 3 strong prominent spines at base of fore wings.

*Abdomen* long, first three segments of nearly equal width and then tapers gradually to segments 7 and 8, which are rounded off to the tube. A pair of prominent spines on outer posterior angles of all abdominal segments which become longer toward the posterior end, the last two pairs being as long as the tube. Tube rather long and slender with a circle of stiff hairs at the end, 8 of which are nearly as long as the tube and the alternating 8 about half as long.

*Males* are very much smaller but otherwise similar. Sometimes show reddish brown or purple pigment. Body length varies from 1.3 mm. to 2.2 mm. with an average of 1.7 for ten specimens.

*Described*<sup>4</sup> from a large number of adults, eggs and larvae collected on bays of the genus *Tamala*. Type localities Daytona and Orlando, Fla.

*EGG*.—The eggs (Plate IX, E.) average .46 mm. x .20 mm. in size, are light straw yellow to orange yellow, and become red during development of the embryo. The surface is sometimes smooth and sometimes covered with irregular scale-like patches; often one side of an egg will show these markings while the other side is smooth.

The average time for development of eggs was 6.5 days (average of 30 eggs). When ready to hatch a lid-like cap splits off the anterior end of the egg, allowing the young larva to escape. The egg shell remains intact on the limb or buds, often for a long period.

The preferred place for laying eggs seems to be among the bud scales on the new shoots. They are also found sometimes in the axils of the leaves or other sheltered places on the limb.

*LARVA*.—*First Instar*.—When first hatched from the eggs the young larvae appear a light carmine red color. Total length, including antennae, about one millimeter, the legs and antennae very long in proportion to the rest of the body. The antennae black, but have a short colorless area at the end of each segment; eyes small and red; two black spots on the thorax so large as to occupy most of the dorsal surface and make the entire thorax appear black; legs and last two abdominal segments dirty white or gray.

<sup>4</sup>Types deposited in the U. S. National Museum.

The average duration of the first instar for 18 individuals was 8.06 days. It varied from 6 to 11 days.

*Second Instar.*—(Plate IX, D.) Color bright carmine red, the larvae being conspicuous on the trees by their brilliant color. The color pigment solid throughout the body and not broken into blotches. Head, antennae, legs and last two abdominal segments clear glossy black. Also two large black spots on the thorax and two rectangular black markings reaching about half way around the center of the third segment from end of abdomen. The body, including legs and antennae, is covered with a number of black hairs or spines.

The larvae are not very active and when moving about often carry the tip of the abdomen curled upward and forward in a characteristic manner. The length of this instar varied from 6 to 13 days with an average of 7.9 days.

*Third Instar.* (Prepupa). Same clear red color as in preceding stages, although the color pigment is somewhat broken into blotches, particularly in head and thorax and near tip of abdomen. Head whitish and almost colorless except for a few blotches of red color in the center; eyes small and red; antennae short, stout and colorless. Wing pads very short and colorless; legs and last two abdominal segments also colorless. A few whitish hairs cover the body.

The larvae in this stage are very inactive. The instar is of short duration, lasting only 2 or 3 days, with an average of 2.4 days.

*Pupa.*—This stage is the same color as the preceding and appears similar except for the length of the antennae and wing pads. The antennae are now longer and folded back along the sides of the head. Wing pads reach to the 4th or 5th abdominal segment. The eyes appear somewhat larger and brown in color.

The pupae are very quiescent and usually remain in secluded places. The stage lasts for 4 to 6 days with an average of 4.5 days.

#### DISTRIBUTION AND HOST PLANTS.

The natural host plants of this insect include all of the bay trees of the genus *Tamala* (family Lauraceae). There is in the State another entirely unrelated group of trees called bays, belonging to the genus *Magnolia* of the family Magnoliaceae. These, of course, have no relation to the laurels and are not concerned in this discussion. Although known to occur only in Florida, it is probable that the bay thrips extends over the entire range of its host plants which includes all of the southeastern states. All four species of *Tamala* have been found infested. The writer has collected *C. laureli* from three of these bays and Watson reports finding it on the fourth,

*Tamala borbonia*, or red bay, near Gainesville. The shore bay, *T. littoralis*, is a very common tree along the sand ridges on the beach near Daytona and in nearly all cases harbors the thrips. In the so-called oak scrub, in central Florida, is a bay known as *T. humilis*, or scrub bay, and the thrips were taken from it between Orange City and Lake Monroe. Probably the most common bay of the State is the swamp bay, *T. pubescens*, which lives around the margin of lakes and along streams and in swampy ground over most of the State. The bay thrips is common on this species in the vicinity of Orlando and is reported by Watson as being found on them near Frost-proof, Florida, and other points on the central ridge of the State. The red bay lives in the higher hammock lands and, as stated above, is also a host of the bay thrips.

The bay thrips also will live on camphor (*Camphora camphora*), but it is somewhat doubtful if it will establish itself permanently there. Several generations have been bred on camphor trees under observation at the laboratory, but no instances have been found where bay thrips have colonized themselves on camphor trees naturally. Camphor trees growing close to bay trees infested with thrips were uninjured. The preferred hosts certainly are the bays. Of the four species of *Tamala* no preference has been observed.

#### LIFE HISTORY AND HABITS.

The length of time required from egg to adult as determined from the average of 50 individuals was 28.3 days. As stated above the egg stage lasted for 6.5 days. The total time for the larval and pupal stages together was 21.8 days as an average. Since there is a preoviposition stage of several days, the period for the maximum generations would be in excess of 30 days. The life of the adult thrip often lasts about 60 days in confinement but in some cases has exceeded this. There is also a postoviposition stage lasting usually for several days preceding death. The bay thrips are not very prolific in number of eggs laid. Ten adults laid an average of 1.06 eggs per day over a period of about 2 months. The greatest number laid on any one day was 4. Many days were passed without any eggs being laid.

The above data were obtained during August and September when the weather was warm. Of course, the various stages would be much longer during the cooler weather. During these experiments the temperatures at the laboratory in Orlando, Florida, were as follows:

For August the daily maximums ranged from 90° F. to 100° F. with a mean of 94° F.; the daily minimums 65° F. to 75° F. with a mean of 71.2° F.; mean temperature for month 82.6° F.; greatest daily range 29° F.; precipitation 4.13 inches. For September the daily maximums ranged from 91° F. to 103° F. with mean of 95.9° F.; the daily minimums 67° F. to 73° F. with mean of 69.6° F.; mean temperature for month 82.8° F.; greatest daily range 32° F.; precipitation 1.93 inches.

Contrary to the sex ratio of many species of thrips, the percentage of males for this species seems to be relatively high, often as many as 50% of those captured being males. The same phenomenon has been observed among those bred in jars in the laboratory, a large number being males. The adults of both sexes have a habit of congregating together and copulation has frequently been seen to occur in the breeding jars. In fact it is very doubtful if this thrips will breed parthenogenetically. In a large number of experiments the adults reared in jars would die without laying eggs when they were not mated with males.

All stages of the thrips are found around the terminal bud and on the new shoots. The young larvae on hatching feed on the newly unfolding leaves, causing brown and dead spots to appear. The later stages of the larvae, as well as the pupae and adults, also feed on the new growth. When very numerous on a tree they will sometimes kill the buds, but ordinarily no damage is done. Although small areas are killed on the new leaves, the leaves later outgrow this injury. The thrips do not cause lesions or other injury to the bark, and no instances have been observed where trees, or even limbs on a tree, have been killed. This, of course, would be expected of a native insect on its natural host.

The adult thrips are always active and usually walk about on the stems and leaves with a rapid motion. They have a characteristic habit of carrying the tip of the abdomen curved

upward and forward. Although possessed of fully developed wings, they have seldom been seen to fly and then only for short distances. When disturbed they will run rapidly around the stem or to some place of hiding. They are often found close down in the axils of newly opening leaves.

These insects possess the ability to puncture the skin. The writer while working with them has often felt a very perceptible stinging sensation from their bite on the back of the hand, neck or other place where the skin is tender.

#### ENEMIES.

One of the factors limiting the increase in numbers of the bay thrips is that it is preyed upon by other insects. At least two of these enemies have been found, one an internal hymenopterous parasite and the other a predaceous Anthocorid.

The first of these is *Tetrastichus* sp.,<sup>5</sup> apparently an undescribed species, and a representative of a genus not known before from Thysanoptera in this country. Internal parasites of thrips while very rare, have been reported in a few cases. Parasitized specimens of this thrips were collected on bay trees in September, 1921, and the adults bred from them in the laboratory. The eggs are laid by the adults in the bodies of the larval stages of the thrips. After a few days the thrips dies and the body becomes dried and swollen. About a week later the small wasp-like parasite emerges from a hole cut through the body wall on the dorsal surface near the end of the abdomen.

The second of these is *Anthocoris* sp.,<sup>6</sup> a small predaceous insect, which was found sucking the juices from the larval and pupal stages of the thrips. While perhaps not so important a factor in control as the internal parasite, still these Anthocorids will destroy a large number of thrips. These two insects undoubtedly are largely responsible for keeping the thrips from increasing and doing a large amount of injury to the bay trees.

#### EXPLANATION OF PLATE IX.

*Cryptothrips laureli* n. sp. A.—Head and prothorax. B.—Antenna enlarged. C.—Tip of abdomen showing tube and hairs. D.—Second stage larva. E.—Egg.

<sup>5</sup>Determined by A. B. Gahan of the Bureau of Entomology.

<sup>6</sup>Determined by W. L. McAtee, of the Bureau of Entomology.